THE TECHNIQUE OF PRODUCTION OF FANCY RED DIAMONDS

Abstract

A technique of producing natural red type Ia diamonds with stable NV color centers which impart a red color to said diamonds. The technique consists in producing isolated substitutional nitrogen atoms, or C centers, in the crystal lattice of natural near-colorless-to-brown type Ia diamonds containing A centers or in the crystal lattice of natural near-colorless high-nitrogenous type Ia diamonds containing over 800 ppm of nitrogen in the form of A and B1 centers. Natural type Ia diamonds containing A centers are HPHT-treated in a high-pressure apparatus at a temperature exceeding 2150^0C and under a stabilizing pressure of 6.0-7.0 GPa. Then they are irradiated with $5 \cdot 10^{15}$-$5 \cdot 10^{18}$ cm^{-2} 2-4 MeV electrons and finally annealed in a vacuum at a temperature exceeding 1100^0C. Natural high-nitrogenous type Ia diamonds containing over 800 ppm of nitrogen in the form of A and B1 centers are irradiated with high-energy electrons with the irradiation dose over 10^{19} cm^{-2} and annealed in a vacuum at a temperature exceeding 1100^0C. Thus red diamonds with stable NV centers absorbing in the 400-to-640 nm range are produced. The invention relates to the treatment (enhancement) of diamonds in order to give them different colors and can be used by the gem and jewelry trade.